



DP-308803

Declaration of Raymond Jose Norland  
Under 37 CFR § 1.132

I, Raymond Jose Norland, make the following declaration:

1. I have taken college level engineering courses at Institute of Technology in Anaheim, California.

2. I have been employed by Delphi Connection Systems and its predecessors as a Senior Project Engineer for four (4) years with responsibility for the design and development of high density electrical connectors.

3. I am personally familiar with the prior art high density electrical connector of the type that is described and illustrated in United States patent application number 10/649,488 filed September 10, 2003, hereinafter the "Patent Application".

4. During my employment, I was assigned the task of improving the performance of the prior art high density electrical connector of the type described in paragraph 3.

5. As part of this task, I conducted a comparison test described in paragraph 6 on a 150 way connector like the prior art high density electrical connector described in paragraph 3 and on a 150 way high density electrical connector of the invention which is characterized by an elastomeric pad that is illustrated in figures 4, 6 and 7 of the Patent Application, hereinafter referred to as the "Dome Elastomer".

6. The test consisted of covering two 0.062 inch thick boards with a flat 0.001 inch thick strip of copper foil to simulate two printed circuit boards, such as the printed circuit boards 14 and 16 illustrated in the Patent Application. These boards were then substituted for printed circuit boards and clamped against a flexible printed circuit (a) in a prior art 150 way high density electrical connector characterized by the ribbed elastomer shown in figures 1 and 2 of the Patent Application and (b) in a 150 way high density electrical connector of the invention characterized by the dome elastomer shown in figures 4, 6 and 7 of the Patent Application.

7. The results of the comparison test described in paragraph 6 are illustrated in attached Exhibit A which shows the witness marks on the flat 0.001 inch thick strip of copper foil test specimens for: (a) the prior art high density electrical connector labeled 150 Way Flex, with Standard Elastomer, and (b) the high density electrical connector of the invention which is labeled 150 Way Flex, with Dome Elastomer.

8. The witness marks for the prior art high density electrical connector show that ribbed elastomer of the prior art creates heavy forces on the top and bottom ends of the perimeter causing uneven forces toward the center portion as stated in paragraph [0028] of the patent application.

9. The witness marks for the high density electrical connector of the invention show that the resiliently deformed Dome Elastomer provides a substantially uniform contact pressure as stated in paragraph [0026] of the Patent Application.

10. As part of the task, I also conducted a second comparison test described in paragraph 11 on a 150 way connector like the prior art high density electrical connector described in paragraph 3 and on a 150 way high density electrical connector of the invention which is characterized by a Dome Elastomer.

11. The second comparison test consisted of taking low level contact resistance (LLCR) measurements from two printed circuit boards that were specifically designed for milliohm resistance measurements. These printed circuit boards were then substituted for the printed circuit boards and clamped against a flexible printed circuit (a) in a prior art 150 way high density electrical connector characterized by the ribbed elastomer shown in figures 1 and 2 of the Patent Application and (b) in a 150 way high density electrical connector of the invention characterized by the Dome Elastomer shown in figures 4, 6 and 7 of the Patent Application.

12. The results of the second comparison test described in paragraph 11 are illustrated in attached Exhibits B and C which show the change in LLCR for: (a) the prior art high density electrical connector, Exhibit B labeled Standard Elastomer, and (b) the high density electrical connector of the invention, Exhibit C which is labeled Dome Elastomer.

13. The change in LLCR for the prior art high density electrical connector, Exhibit B, shows considerable variation in contact resistance which indicates that elastomeric pad of the prior art provides an uneven distribution of forces as indicated in paragraph [0028] of the patent application.

14. The change in LLCR for the high density electrical connector of the invention, Exhibit C, shows that a tight variation in contact resistance within a two (2) milliohm bandwidth which indicates that the dome elastomer of the invention provides an improved pressure distribution that can be characterized as a substantially uniform contact pressure.

15. An attached Exhibit D shows a transverse section of a high density electrical connector of the invention characterized by a Dome Elastomer. The section of Exhibit D shows that the arcuate surface and the longitudinal ribs of the Dome Elastomer are flattened out when the Dome Elastomer is clamped in place as stated in paragraph [0026] of the Patent Application.

16. The undersigned being warned that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001, and that such willful false statements and the like may jeopardize the validity of the application or document or any registration resulting therefrom, declares that all statements made of his own knowledge are true; and all statements made on information and belief are believed to be true.

  
Raymond Jose Norland

Dated: 6/21/04